Mobile App Programming II Bibliography Part II

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References

[10.1] Kirkpatrick, Keith. Still waiting for self-driving cars. *Commun. ACM*, 65(4):12–14, mar 2022.

Abstract: The introduction of self-driving cars has garnered a large media presence over the last several years. While experts have been calling for public release of fully autonomous vehicles for a few years now, the reality is that safety concerns and regulatory issues remain largely in the way. Out of the 5 levels of autonomous driving capability, most new cars fall somewhere within the first three levels. As for the technology, it simply isn't there yet. The cameras and sensors that detect the world around the vehicle as well as the algorithms that act upon this data are still years away from being perfected. As a matter of fact, there are an indefinite number of variables that the AI of an autonomous vehicle needs to be able to handle which is no small task. The systems involved in training autonomous vehicles also require some degree of understanding of human behaviors. For instance, when a pedestrian is crossing the road, who may or may not be aware of the presence of the driver of the vehicle. Creating an autonomous vehicle that is aware of social cues is an intensive process that may take years and massive compute power to accomplish. In addition to the technology, one of the biggest challenges self-driving cars are facing is regulatory clarity. One cause for concern with self-driving vehicles is due

to all the distractions built into the vehicles that can lead to a driver not paying attention to the road.

[10.2] Smallwood, Thomas R. C., Lefebvre, Véronique, and Bengtsson, Linus. Mobile phone usage data for disaster response. *Commun. ACM*, 65(4):40–41, mar 2022.

> **Abstract:** Natural disasters can affect large populations and displace people from their homes. The act of mobilizing data to help identify locations of those affected can help humanitarian efforts during times of crisis. By aggregating Call Detail Records (CDRs) with the support of Mobile Network Operators (MNOs), it is possible to gain insight about the location of a population without breaching privacy. CDRs typically contain information such as the time of a call or text message, and the cell site the communication was routed through. Since the CDR data is collected in large quantities in near real-time, tracing the location of populations can be done rather quickly during a disaster. Due to being the most valuable indicators during a disaster, the process of disseminating indicators from CDR data remains to be an area for improvement.

[11.1] Allen, Christopher. The path to self-sovereign identity. *Life With Alacrity*, apr 2016.

> **Abstract:** The digital age has brought with it an endless amount of information sharing across web-based platforms that are responsible for keeping user information secure and, to some degree, private. However, given that user data is managed by services online instead of by the individual, a lot of personal information is often shared and even sold to other platforms or companies online. What if there was a way to have a trusted digital identity that also maintained user privacy? This is where the idea of a self-sovereign identity comes into play. Self-sovereign identity would allow anyone to establish and maintain their own digital identity, as opposed to being assigned an identity from a third-party platform or service. The path to self-sovereign identity

is described to take place over four phases: centralized identity, federated identity, user centric identity, and finally self-sovereign identity. In order to achieve truly self-sovereign identity, ten principles need to be incorporated, namely existence, control, access, transparency, persistence, portability, interoperability, consent, minimalization, and protection.

[11.2] Denning, Peter J. Systems abstractions. *Commun. ACM*, 65(4):22–24, mar 2022.

Abstract: Abstraction in computational systems such as operating systems and more particularly computer processes are a strong foundation that has been around for decades. Originally, abstractions for operating systems were built upon modules and interfaces, which proved to be not all that efficient and difficult to debug. Thus concurrency control had to be established in order to handle all of the computations being run by many users. After processes were introduced into the operating system architecture, the idea for non-terminating computation using waiting states came about, leading to the modern design for operating systems that is used today. In a general sense, abstraction is an important aspect of any complex system. Abstractions typically occur in layers. Most modern operating systems use layered abstraction from lower level abstraction such as kernel operations, to higher level abstractions like user processes and services. The layered approach allows programmers to build on top of the lower levels without needing to directly interact with those layers. Overall, abstraction is quite a powerful tool in the study of computing.

[12.1] Ali, Shaukat, Yue, Tao, and Abreu, Rui. When software engineering meets quantum computing. *Commun. ACM*, 65(4):84–88, mar 2022.

Abstract: Quantum computing is an area of development in computer science and engineering regarding the advancement of computational processing power. Quantum computing uses quantum superposition techniques

to establish large amounts of parallel processing power. In order to create applications of quantum computing, there needs to be a quantum software stack including operating systems, programming languages and compilers. Quantum software engineering initiatives have started to ramp up with several private companies such as Google and IBM, and various research organizations in Europe accelerating research, development and education. When comparing quantum software engineering to traditional software engineering, a key component that is not yet present in quantum software engineering is the software development lifecycle, which typically follows the process of blueprinting, designing, debugging and maintaining software. Currently, quantum software engineering requires an understanding of quantum mechanics, linear algebra, algorithms and their analysis, etc. Several methods are being developed to attempt to establish a quantum equivalent to the traditional software development lifecycle. As more innovations to quantum software engineering make way, it is only a matter of time before several applications of the technology become possible.

[12.2] of Michigan, University. Wearables can track covid symptoms, other diseases. *ScienceDaily*, apr 2022.

Abstract: Based on a study conducted by the University of Michigan, wearable smart devices such as smart watches could potentially be used to report if a user has contracted COVID-19. The focus of the study was on participants' heart rates, which were used to determine the symptoms of COVID-19. It was discovered that several biological signals were dampened or otherwise altered by the impacts of COVID-19. Wearable smart devices are well-equipped to monitor a person's heart rate and thus can be used to track symptoms and the progression of a COVID-related illness using this same methodology. The researchers in the study purported that their data could be used to build algorithms that would operate on these smart devices and benefit the healthcare industry overall.